EXHIBIT B

Santa Cruz County Resource Conservation District

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This letter was prepared to communicate the design approach for stabilization/repair of the Blue Trail Gully, located roughly 700 feet north of the Santa Cruz Gardens sub-division and within the Arana Gulch Watershed, Santa Cruz County, California. The gully complex drains to the East Branch of Arana Gulch from the south and is situated just below the watershed divide, which separates the Arana and Rodeo Gulch watersheds.

Preparation of this letter is in accordance with the request from the Regional Water Quality Control Board for additional project narrative and the funding matrix for implementation.

This letter has been organized under the following:

- Project Site Narration and Description
- Project Funding and Project Management
- Time table

Project Site Introduction

The active portion of the Blue Trail gully complex includes five discrete gully arms, two of which have developed over the past three years and continue to grow. Approximately 50 feet down drainage from the gully complex, before entering the redwood canopy, a discrete channel exists with approximate dimensions of 3 feet (width) by 1 foot (average depth); this reach of channel shows signs of being quasi stable as the bed is covered in alluvium and stabilized by root structure of the various species of riparian trees found there. Upon entering the redwood canopy adjacent to Arana Gulch, the slope of the channel steepens significantly to 5 to 8 percent and enlarges to dimensions of roughly 4 feet (width) by 3 feet (depth). Active incision is occurring along the channel within the redwood canopy, but the incision is visibly slower than in the gully area.

Geomorphic Site Considerations

The Blue Trial gully drains a watershed of approximately 9 acres, of which 8 acres are upstream of the present head of incision. The watershed heads along the ridge trail at an elevation of 320 feet, emptying into Arana Gulch at an elevation of about 200 feet (NGVD datum of 1929). The watershed is almost entirely underlain by the Purisima sandstone, a highly erosive, weakly consolidated and friable silty sandstone deposited during the late Miocene and Pliocene epochs, presently dipping 2 to 6 degrees to the southeast.

In 1963, the as-yet intact location of the present gully complex supported low-lying, grassy vegetation except for smaller hardwoods which lined the channel draining the swale. The channel which drained the swale in the 1963 aerial photograph appears to occupy roughly the same course as the channel that presently exists below the gully complex. The 1963 channel draining the swale extended upstream 300 feet from the lower redwood canopy along the East Branch.

Perhaps most significantly, the 1963 aerial photographs indicate that neither the gully complex nor the "Blue Trail" existed at the site at that time. A seepage zone is evident in the 1963 photographs along the edge of the forest canopy to the south of the channel draining the swale (and the present gully project site). At the time of the photograph, the seepage zone was roughly 100 feet wide by 300 to 400 feet in length. Presence of the seepage zone south of the gully complex indicates an historic pattern of emergent shallow ground water—a hydrologic characteristic which could have some responsibility for gully initiation.

Conditions at the site changed from 1963 to April 12, 1985. By 1985, a gully had been initiated from the head of the channel draining the swale. The gully extended upslope from the head of the drainage channel by 30 to 50 feet but had not yet bifurcated into the multi-armed gully complex which presently exists. The gully was lined with trees and was oval shaped with the long axis oriented downslope. The Blue Trail is visible in the 1985 photograph as a bare soiled surface winding down to Arana Gulch through the swale. By 1985, the total area of canopy coverage within the swale had increased, perhaps suggesting that during pre-settlement times the swale was more heavily forested. The footpath, from the ridge road to the bottom of the gully complex, is addressed in the gully complex repair plan.

Factors Leading to Gully Development and Present Growth

Gullying at the Blue Trail site is likely the result of several interactive factors. At the basic level, much research has shown that a land surface disturbance is required for channelization to occur on vegetated slopes (e.g., Prosser and Dietrich, 1995)—what this means is that some type of disturbance is needed for gullying to develop on well vegetated slopes up to 35-40 degrees in slope. Site soil characteristics imply that the hazard of erosion is likely sufficient for channelization to occur if some initial disturbance were to have occurred in the past. For the purpose of developing a stabilization plan for the gully complex, it is not necessary to accurately portray historic

events which led to development of the gullies. But rather, it is important to understand those site characteristics which are presently (and historically) cooperating factors in the continued growth of the gully complex. These characteristics include:

- Over-steepened, un-vegetated gully sidewalls (subjected to failure during saturation by pore-water pressure release and ground-water discharge);
- Improperly constructed and maintained footpath (Blue Trail) which delivers excess runoff to the gully complex and interrupts shallow ground water moving downslope to the gully complex;
- Occurrence of a seep zone along the southern margin of the gully complex;
- Overland runoff (generated during large rainstorm events) directed into one arm of the gully complex generated from the drainage located directly upslope from the gully complex; and,
- Repeated disturbances associated with trail activity and maintenance of the City's water main and the Pacific Gas & Electric transmission lines which share its right of way.

The site design addresses each of these cooperating factors, resulting in a plan that provides for stability and repair of the gully complex site along the Blue Trail.

From an ecological perspective, the site design has incorporated the most ecologically appropriate and best long-term solution for the Blue Trail gully complex. We believe that implementation of the design will result in restoration of the site to form and functions approximating pre-disturbance conditions.

Description of the Design

The restoration plan design goal for Blue Trail gully is to restore the gully complex to a natural swale-type topography. Grading and placing stabilizing fill within the gully complex will primarily accomplish this. For a successful long-term remedy, shallow ground-water collection trenches at the head of the gully complex, and a buried gabion basket discharge/buttressing apron at the toe will be installed. Objectives include spreading the flows to diminish velocities and promote local infiltration (rather than concentration), planting a variety of native species to enhance soil stability and site aesthetics. A secondary benefit of achieving these objectives would be slight reductions to storm runoff volumes and peaks from the gully complex to the main stem of Arana Gulch.

The general steps leading to restoration of swale-type topography will include:

Site Grading, Sub-draining, Fill Placement and Materials:

Preparation of the gully surfaces by traditional benching and sub-draining methods to prepare the gully complex for fill placement. Two shallow groundwater collection trenches will be installed at the head of the gully complex.

A keyway will be constructed at the toe of the gully complex and benches will be cut and sub-drained for stability. Fill will be placed in intervals of a specified thickness followed by compaction of those intervals before the placement of subsequent fill intervals. The specifications of fill interval thickness, compaction level, and moisture content are detailed in the construction specifications. Fill will be delivered down to the site by means of a conveyor system extending from the upper staging area at the north end of Katherine Drive to the lower staging area south of the gully complex following the trend of the City Water Main.

Finished Side Slopes:

The finished side slopes of the new swale topography will likely range from 3.5:1 to 2:1 in grade and will feed down to two swale axes, as depicted in the attached preliminary grading plan.

Erosion Control and Vegetation:

The swales will be lined with TRM and the side slopes will be lined with an erosion control blanket with contains no plastic. Coir logs will be placed on the erosion control blanket at the specified intervals perpendicular to the direction of slope drainage and will be installed to drain towards the two swales. The entire restoration site will be planted with appropriate, native vegetation and will be irrigated for the first dry season compliments of the City of Santa Cruz.

Opportunities/Constraints

The gully restoration design consists of several opportunities and constraints.

Opportunities:

- Reduce sediment production and ultimate delivery to Arana Gulch
- Long-term aesthetics: enhance vegetative cover and wildlife benefits
- Simultaneous repair/re-construction of the Blue Trail
- Provide additional support to the City of Santa Cruz water pipeline
- Increase/enhance locale infiltration (regional benefits)
- Reduce downstream winter peak streamflows and the coupled accelerated erosion of Arana Gulch
- Slow-down incision of redwoods reach and preserve existing redwoods

Constraints:

- Location of site (access is difficult)
- Short-term aesthetics (loss of existing vegetation within the complex)
- Use of synthetic materials in restoration activities (erosion control materials)
- Impacts to neighborhood from truck traffic (delivery of fill material and equipment)
- Cost

Quantity of Materials Needed and Estimation of Implementation Cost

The first table covers estimated costs and materials for the gully complex while the second table covers project funding package:

Table 1 Estimated Costs for Gully Complex

TASK	DESCRIPTION	COST
A	Mobilization, Site setup (e.g. equipment, temp. facilities, staking, layout, protective fencing and marking utilities)	$20,000
B	Clearing vegetation, grubbing, and disposing of materials	$32,000
C	Erosion Control: install TRM and EC blanket and rolls	$32,000
D	Earthwork: fill placement and compaction using conventional tracked equipment with low ground pressures.	$95,000
E	Earthwork: installation of conveyor system and conveying soil to lower staging area	$30,000
F	Installation of sub-drain pipes and Gabion Baskets	$60,000
G	Irrigation	$14,810
H	Import approximately 641 cubic yards soil	$17,000
I	Soil Engineer on site during compacting of fill, and report regarding work completion.	$5,000
J	Revegetation (materials and labor)	$15,000
K	Project oversight and management*	$28,000
L	Contingency	$25,000
	**TOTAL	**$375,000**

**We will be going out to bid on this project and hope that the overall total cost will be reduced.

Table2 Funding Package

FUNDERS	AMOUNT
CITY OF SANTA CRUZ	$115,000
PROP 50 (2008)	$150,000
LOCAL MATCH (pending)	$75,000
CA COASTAL CONSERVANCY (to be requested if needed)	$35,000
TOTAL	**$375,000**

* ***Project oversight and management*** will be handled by lead agency, Santa Cruz County Resource Conservation District (RCD). Project management funds are for contract management of project, processing invoices, verifying work is consistent with stipulated judgement, monitoring work product, communications and reports. RCD tracks the project from start to finish and generates reports for RWQCB. 3% of the dollar amount of the total project is required for auditing all RCD funds.

Project time table

Completion of the project through erosion control is estimated to require 3 weeks or 15 working days. Planting will take from 2 to 4 days. Commencement of construction will begin with the delivery of equipment and materials to the site. Survey staking will be conducted. Grubbing and removal of plant material on the site will be carried out. Grading, sub-drainage facilities, gabion basket installation, and irrigation plumbing occurs next followed by erosion control measures and the irrigation distribution system. Revegetation planting will occur last.

Closing

Thank you for your consideration and I look forward to receiving your comments. Should you have any further questions, please do not hesitate contact me.

Sincerely,

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